

AMENDMENTS TO THE CLAIMS

1-26. (Cancelled)

27. (Previously Presented) A semiconductor substrate processing apparatus, comprising:
a carry-in and carry-out section for carrying in and carrying out a semiconductor substrate having a surface on which a circuit is formed, in a dry state;

a plated metal film forming unit for forming a plated metal film on said semiconductor substrate which has been carried in;

a bevel etching unit operable to supply an acid solution to a center portion of said semiconductor substrate being rotated and to supply an oxidizing agent solution to a peripheral edge portion of said semiconductor substrate for etching and removing at least one of said plated metal film, a seed layer and a barrier layer formed at the peripheral edge portion of said semiconductor substrate, and operable to rotate said semiconductor substrate so as to spin-dry said semiconductor substrate which has been etched;

an annealing unit for annealing said semiconductor substrate; and

a transport mechanism for transporting said semiconductor substrate between said units, said transport mechanism having a dry hand for handling said semiconductor substrate in a dry state and a wet hand for handling said semiconductor substrate in a wet state.

28. (Original) The semiconductor substrate processing apparatus according to claim 27, wherein said plated metal film forming unit, said bevel etching unit, and said annealing unit are interchangeable.

29. (Original) The semiconductor substrate processing apparatus according to claim 27, comprising a film thickness measuring unit for measuring and/or detecting a film thickness of said film and/or a surface state of said film formed on said semiconductor substrate;

wherein said plated metal film forming unit, said bevel etching unit, said annealing unit, and said film thickness measuring unit are interchangeable.

30. (Original) The semiconductor substrate processing apparatus according to claim 29, wherein said film thickness measuring unit has an alignment function for said semiconductor substrate.

31. (Original) The semiconductor substrate processing apparatus according to claim 27, wherein in said plated metal film forming unit, plating treatment and cleaning treatment are performed in such a state that said semiconductor substrate is held by a substrate holding portion.

32. (Currently Amended) The semiconductor substrate processing apparatus according to claim 27, wherein said plated metal film forming unit comprises a substrate holding portion for holding said semiconductor substrate, an anode disposed above a surface, to be plated, of said substrate, ~~and~~ a cathode electrode for passing an electric current in contact with said substrate, ~~and performs plating while~~ a plating liquid impregnated material comprising a water retaining material, and is operable to perform plating while said plating liquid impregnated material is placed in a space formed between said surface to be plated and said anode.

33. (Original) The semiconductor substrate processing apparatus according to claim 27, wherein in said plated metal film forming unit, plating treatment, and cleaning and drying treatment are performed by raising and lowering said semiconductor substrate so as to correspond to respective operating positions, while said semiconductor substrate is held by a substrate holding portion.

34. (Original) The semiconductor substrate processing apparatus according to claim 27, wherein said plated metal film forming unit holds said semiconductor substrate such that a surface, to be plated, of said semiconductor substrate faces upward, seals a peripheral edge portion of said surface, to be plated, of said semiconductor substrate with a seal in a watertight manner, has an anode disposed above said surface to be plated in proximity to said surface to be plated, has a cathode electrode for passing an electric current in contact with said semiconductor substrate, and performs plating while a plating liquid is held in a space formed by said surface, to be plated, of said semiconductor substrate and said seal.

35. (Original) The semiconductor substrate processing apparatus according to claim 27, wherein said plated metal film forming unit comprises a substrate holding portion for holding said semiconductor substrate such that a surface, to be plated, of said semiconductor substrate faces upward, an anode disposed above said surface, to be plated, of said semiconductor substrate, a cathode electrode for passing an electric current in contact with said semiconductor substrate, and a pure water supply nozzle, and simultaneously cleans said semiconductor substrate and said cathode by supplying pure water from said nozzle after completion of plating treatment.

36-62. (Cancelled)

63. (Currently Amended) A semiconductor substrate processing apparatus, comprising:
a carry-in and carry-out section for carrying in and carrying out a semiconductor substrate having a surface on which a circuit is formed;

a plated metal film forming unit for forming a plated metal film on said semiconductor substrate which has been carried in;

a bevel etching unit operable to supply an acid solution to a center portion of said semiconductor substrate being rotated and to supply an oxidizing agent solution to a peripheral edge portion of said semiconductor substrate for etching and removing at least one of said plated metal film, a seed layer and a barrier layer formed at the peripheral edge portion of said semiconductor substrate, said bevel etching unit operable to rotate said semiconductor substrate so as to spin-dry said semiconductor substrate which has been etched, and operable to change a bevel etching time based on a thickness of said plated metal film;

an annealing unit for annealing said semiconductor substrate;

a film thickness measuring unit for measuring and/or detecting a film thickness of said film and/or a surface state of said film formed on said semiconductor substrate; and

a transport mechanism for transporting said semiconductor substrate between said units.

64-68. (Cancelled)

69. (Currently Amended) A semiconductor substrate processing apparatus, comprising:
a carry-in section for carrying in a semiconductor substrate having a surface on which a circuit is formed;

a plated metal film forming unit for forming a plated metal film on said semiconductor substrate which has been carried in;

an annealing unit for annealing said semiconductor substrate;

a cleaning unit for cleaning said semiconductor substrate; and

a transport mechanism for transporting said semiconductor substrate between said units;

wherein said plated metal film forming unit can perform pretreatment, plating treatment, and cleaning treatment;

said plated metal film forming unit comprises a seal member and a substrate holding portion adapted to be raised and lowered between a lower position, an upper position, and a middle position;

said semiconductor substrate is placed onto said substrate holding portion at the lower position;

said seal member is pressed against an peripheral edge portion of said semiconductor substrate at the upper position to allow a plating liquid to be retained on an upper surface of said semiconductor substrate; and

a cleaning water is supplied to said semiconductor substrate at the middle position.

70. (Currently Amended) A semiconductor substrate processing apparatus, comprising:

- a carry-in and carry-out section for carrying in and carrying out a semiconductor substrate having a surface on which a circuit is formed, in a dry state;
- an electroless plating apparatus for performing electroless plating process on said semiconductor substrate;
- an electroplating apparatus for performing electroplating process on said semiconductor substrate;
- a bevel etching unit for etching a peripheral edge portion of said semiconductor substrate; and
- a cleaning and drying unit for cleaning and drying the semiconductor substrate to which plating has been applied;

wherein said electroplating apparatus comprises a seal member and a substrate holding portion adapted to be raised and lowered between a lower position, an upper position, and a middle position;

said semiconductor substrate is placed onto said substrate holding portion at the lower ~~portion~~ position;

said seal member is pressed against an peripheral edge portion of said semiconductor substrate at the upper position to allow a plating liquid to be retained on an upper surface of said semiconductor substrate; and

a cleaning water is supplied to said semiconductor substrate at the middle position.

71. (Cancelled)

72. (Currently Amended) A semiconductor substrate processing apparatus, comprising:
a carry-in section for carrying in a semiconductor substrate having a surface on which a circuit is formed;
a liquid supply equipment having a plating liquid tank;
a plating module for performing plating process on a semiconductor substrate;
an annealing unit for annealing said semiconductor substrate;
a bevel etching unit for etching a peripheral edge portion of said semiconductor substrate;
and
a transport mechanism for transporting said semiconductor substrate.
wherein said plating module comprises a seal member and a substrate holding portion adapted to be raised and lowered between a lower position, an upper position, and a middle position;
said semiconductor substrate is placed onto said substrate holding portion at the lower position;
said seal member is pressed against an peripheral edge portion of said semiconductor substrate at the upper position to allow a plating liquid to be retained on an upper surface of said semiconductor substrate; and
a cleaning water is supplied to said semiconductor substrate at the middle position.

73-94. (Cancelled)

95. (New) The semiconductor substrate processing apparatus according to claim 27, wherein

said bevel etching unit includes a central fluid discharge member and a source of the acid solution in fluid communication with said central fluid discharge member, such that said bevel etching unit is operable to supply the acid solution to the center portion of the substrate by having the acid solution be supplied from said source of the acid solution to said central fluid discharge member and then discharged from said central fluid discharge member.

96. (Original) The semiconductor substrate processing apparatus according to claim 95, wherein said plated metal film forming unit, said bevel etching unit, and said annealing unit are interchangeable.

97. (New) The semiconductor substrate processing apparatus according to claim 95, comprising a film thickness measuring unit for measuring and/or detecting a film thickness of said film and/or a surface state of said film formed on said semiconductor substrate;

wherein said plated metal film forming unit, said bevel etching unit, said annealing unit, and said film thickness measuring unit are interchangeable.

98. (New) The semiconductor substrate processing apparatus according to claim 97, wherein said film thickness measuring unit has an alignment function for said semiconductor substrate.

99. (New) The semiconductor substrate processing apparatus according to claim 95, wherein in said plated metal film forming unit, plating treatment and cleaning treatment are performed in such a state that said semiconductor substrate is held by a substrate holding portion.

100. (New) The semiconductor substrate processing apparatus according to claim 95, wherein said plated metal film forming unit comprises a substrate holding portion for holding said semiconductor substrate, an anode disposed above a surface, to be plated, of said substrate, a cathode electrode for passing an electric current in contact with said substrate, and a plating liquid impregnated material comprising a water retaining material, and is operable to perform plating while said plating liquid impregnated material is placed in a space formed between said surface to be plated and said anode.

101. (New) The semiconductor substrate processing apparatus according to claim 95, wherein in said plated metal film forming unit, plating treatment, and cleaning and drying treatment are performed by raising and lowering said semiconductor substrate so as to correspond to respective operating positions, while said semiconductor substrate is held by a substrate holding portion.

102. (New) The semiconductor substrate processing apparatus according to claim 95, wherein said plated metal film forming unit holds said semiconductor substrate such that a surface, to be plated, of said semiconductor substrate faces upward, seals a peripheral edge portion of said surface, to be plated, of said semiconductor substrate with a seal in a watertight manner, has an anode disposed above said surface to be plated in proximity to said surface to be plated, has a cathode electrode for passing an electric current in contact with said semiconductor substrate, and performs plating while a plating liquid is held in a space formed by said surface, to be plated, of said semiconductor substrate and said seal.

103. (New) The semiconductor substrate processing apparatus according to claim 95, wherein said plated metal film forming unit comprises a substrate holding portion for holding said semiconductor substrate such that a surface, to be plated, of said semiconductor substrate faces upward, an anode disposed above said surface, to be plated, of said semiconductor substrate, a cathode electrode for passing an electric current in contact with said semiconductor substrate, and a pure water supply nozzle, and simultaneously cleans said semiconductor substrate and said cathode by supplying pure water from said nozzle after completion of plating treatment.

104. (New) The semiconductor substrate processing apparatus according to claim 63, wherein

said bevel etching unit includes a central fluid discharge member and a source of the acid solution in fluid communication with said central fluid discharge member, such that said bevel etching unit is operable to supply the acid solution to the center portion of the substrate by having the acid solution be supplied from said source of the acid solution to said central fluid discharge member and then discharged from said central fluid discharge member.

105. (New) The semiconductor substrate processing apparatus according to claim 69, wherein

said substrate holding portion is adapted to be raised and lowered between the lower position, the upper position and the middle position by being adapted to be raised or lowered to a respective one of the lower position, upper position and middle position, and stopped thereat.

106. (New) The semiconductor substrate processing apparatus according to claim 70, wherein

said substrate holding portion is adapted to be raised and lowered between the lower position, the upper position and the middle position by being adapted to be raised or lowered to a respective one of the lower position, upper position and middle position, and stopped thereat.

107. (New) The semiconductor substrate processing apparatus according to claim 72, wherein

said substrate holding portion is adapted to be raised and lowered between the lower position, the upper position and the middle position by being adapted to be raised or lowered to a respective one of the lower position, upper position and middle position, and stopped thereat.